

culate types will be found to arise from paucispiral nuclei. These extremes of operculum development are seen to be correlated generally with advanced development of other organs. A final stage is here apt to occur in which the operculum is altogether lost.

The course of evolution here sketched has not marched regularly through the gasteropod phylum. On the contrary it is suggested that in several different groups the operculum has strayed independently along this road of degeneracy.

**A SHELL HUNT IN THE BLACK RANGE, WITH DESCRIPTION OF
A NEW OREOHELIX.**

BY JAS. H. FERRISS.

A stop-over at Deming in the summer of 1915, to shake hands with Dr. Swope, deflected the firm of Pilsbry & Ferriss in their snail explorations from the Mogollon Mountains, via Silver City, to the Black Range, via Cook's Peak. Samuel D. Swope, M. D., promoter of civic prosperity, friend of conservation and science, knew the unexplored snail country, and with bake ovens and tactful advice sent us to the biggest mountain range in New Mexico.

Cook's Peak, one of the earliest land-marks of California overland emigrants, interesting botanically and historically, had no encouragement for us in conchology. At the post office of Swarts, on the Mimbres river, we transferred from a heavy wagon and its mule team to a pack train of horses, sufficient for two ladies, two men and a camp outfit. In that exchange we got Teodoro Solis, formerly of Chihuahua, the best packer and camper alive.

A large colony of *Ashmunellas* was found in the foot hills. The next day at Mitchell Gray's mining cabin on Silver Creek, well up the side of Sawyer's Peak, both *Ashmunellas* and *Oreo-helix* came out to meet us a few feet from camp. We reveled here a week or so with the snails of Sawyer and then followed the continental divide northward, Sierra county on the right, Grant county on the left.

At the Reed ranch, head of Black Canyon, I was left to finish the Black Range alone. The Doctor had made engagements in California and the ladies had schools and conventions calling them to Joliet. Teodoro safely loaded my companions into an auto at the Hot Springs resort and upon his return the work was continued for another month by way of Black Canyon, Diamond Creek (where we were detained briefly by enormous speckled trout), then over the range eastward, making our first camp at the ranch of Teodoro's brother near Chloride.

This was the forest primeval. The trail ran about nine to ten thousand feet in elevation and the yellow pine, Douglas fir, spruces and quaking asps were large and thick. It was our highest and wildest range to date. The cattle, wild and keen of scent, are trapped for slaughter in corrals with swinging gates, something like monster turkey-traps. Black and silver-tipped bears, and mountain lions were plentiful. A couple of untamed, off-the-reservation Apaches also were hiding in what seemed to be our best snail coves. We saw one a few seconds but did not catch him. Deer and turkey were fairly abundant, and the whole country is marked by interesting historical events. Near here Dr. Fewkes had dug some of his most valued specimens of prehistoric pottery. At one point a train of pack burros had rolled down into the Las Animas country. During our short stay two saddle horses also rolled down into that cavern of lost souls. In one of the gulches the bones of an unknown soldier had lain so long his clothing and a roll of money were destroyed by the weather. On the Kingston trail a bear dropped out of a tree upon a packer and killed him. Here Apache Kid had robbed and burned a miner's cabin, and at another point, lying in wait behind a rock, he shot a miner in the back; and when we dropped down into Chloride we met the men who followed this same Apache Kid into the San Mateo range and killed him—saw the mule that packed their dunnage, and located the men in Chicago who sent Kid's head to the Yale skull and bone fraternity. Also saw the carcass of a bull that killed a ranch-owner's saddle horse, and was killed and pried off the angry and pompous owner by an efficient cowboy.

I soon found myself in the whirl of Black Range society. Off

upon an independent excursion of my own a mad cow obstructed the right of way. The law was upon my side but I knew the peculiarities of Spanish half-breed cattle well enough to get behind a tree, and did my best. Going around the tree rapidly, I kept behind it all but once and then in a fleeting second was fairly introduced. Grasping her heartily by the horns, I shook them; but the impulsive creature was really overwhelming in her attention, and upon her knees walked all over me. This spot is now marked, and it is quite a large one. Luckily the same cowboy with his 45 that killed the bull, came up the trail and with a bang released me from further embarrassment. Pride only received a jolt. My horsehide coat was cow-proof.

Again when alone, and my thoughts were far away, just at dusk, a robust mountaineer from the Great Smokies came into camp to show me the mummied right hand of the last man who climbed the trail to take him back to Tennessee. As a stranger, and a little timid, it was my part to show that I had no particular interest in the specimen; but those mountaineers possess keen insight into the minds of the tender-feet and I presume the camp site is marked also. However, the dwellers of the high and lonesome will never find the spot where I lay out the rest of the night watching to see if that uncanny naturalist was coming back with any more fragments of his specimen.

After leaving the limestone gulches of Sawyer Peak, shells were rare. Sonorellas take kindly to granite; but there are no Sonorellas in this range. Ashmunellas are also friendly to granite; but the *Oreohelix* split. *Ore. cooperi*, the quaking-aspid, and *Ore. depressa*, are found in all rocks and under down timber; but *Ore. metcalfi* and *Ore. chiricahuana* never leave the limestone, neither do any of the *Holospiras*. Very seldom also have any two of the same genus been found in the same colony. Never with *Holospiras*, and with *Ashmunellas* only when a toothed and a toothless form come together. In the Black Canyon region I found a very few individuals of *Ore. cooperi* in with colonies of *Ore. depressa* and we also found this great Rambler occasionally in the limestone with colonies of *Ore. metcalfi* on Sawyer. In Southern Arizona we have found two and

three species of Sonorellas in large slides. As a rule it is one species at a time in the south-west, and it is a surprise, great luck, if more than one genus of those noted above turn up in any one colony. With the little fellows it is different. They have some peculiarities, but as a rule go it as they please, hit or miss.

In the limestone foothills, while mining, Teodoro had seen shells. We went to the exact spots, both at Chloride and Hermosa, but no traces of shells were there. The fumes of the smelters, blasting, chickens, loss of timber, disease, starvation or something, had removed them from that vicinity. In a hill on the Little Palomas I found two bones of *Oreohelix*, but two hours of hard digging did not find any more signs. Of *Holospiras* there were plenty.

At Chloride the proprietor of the Oliver mines told us he had seen fossil shells deep in the dirt at his camp. Here seemed to be a good place to get at least well-preserved bones, and after our return from a side trip to the Cuchillo range, Monticello, Animosa Canada and the San Mateo range, we visited Mr. Oliver's camp. This happy spot is located on Mineral Creek, five miles above Chloride, in a narrow belt of limestone. Under the limestone spawls and fallen timber live shells were abundant. We ate our lunch at a maiden-hair spring, picking shells and water cress during the process. The fern (*Adiantum capillus-veneris*) had pinnae an inch wide, a form that has been wrongfully catalogued from the Grand Canyon of Arizona as *A. tenerum*, the Florida species. A branch of the stream southward, with hard limestone and a dry hillside, had no shells. The belt northward was not examined.

I returned to Deming via Hermosa, Las Animas Canyon, Hillsboro, and Kingston. The story of the findings will be told jointly in another article, but I desired to name this ribbed, gaudy and hard-to-find species of Chloride all by myself, in honor of one who has encouraged me so much to spend more than thirty of my vacations in bear, cow and catamount countries :—

OREOHELIX PILSBRYI, n. sp.—With numerous spiral beaded cords, this belongs to the *haydeni* school of sculpturing. In

color it is unevenly blotched white and horn color, a few examples opaquely white. When blotched or mottled, the cords and growth wrinkles are often white, thus intensifying the contrast between the two colors. Spire elevated, whorls depressed and sharply carinated. Spiral cords from 5 to 9, with two strong cords or one strong cord between two smaller cords, above the periphery. Fine spiral striae between cords, strongest on the under surface. Growth wrinkles strong, 2 to 6 per mm., a large wrinkle about every one and one-half mm. gives the under surface a checkered effect. Whorls $4\frac{1}{2}$, umbilicus small, funnel-shaped, not cylindrical, all whorls visible to the apex. Embryo whorls $2\frac{1}{2}$, darker-colored, smoother than later whorls but plainly marked by spiral cords and oblique growth wrinkles. Mouth oblique, and in older individuals lip sometimes stained yellow. In the aged the last whorl often drops half below the periphery.

Alt. 10, diam. 17.5 mm. (No. 112918a, A. N. S. P.)

“ 11, “ 18 mm.

Type specimens in my own collection and in the Academy of Natural Sciences of Philadelphia.

These shells had an enemy which broke an irregular hole in the upper surface of the shell, about 2 mm. in diameter. I have not noticed this form of destruction in other colonies of land shells.

THE NATURE OF THE CONICAL BODIES ON THE MANTLE OF CERTAIN NUDIBRANCHS.

BY W. J. CROZIER.

Contributions from the Bermuda Biological Station for Research, No. 57.

A study of the supposed “warning” coloration of brilliantly pigmented nudibranchs as represented by *Chromodoris zebra* Heilprin, has incidentally made clear the previously unknown significance of the “white conical bodies” which occur on the posterior ventral surface of the mantle of this species and give it a beaded appearance. Since white nodular structures of a presumably similar character have been noted upon the mantle